



**COSMIC SOCCERBALL?** — Walt Salyer of CSD Protective Equipment Branch, left, and suit subject Robert K. Williams of Power and Propulsion Division prepare an evaluation run with the 34-inch diameter personnel rescue enclosure proposed for Space Shuttle. Williams is wearing a JSC-designed Shuttle space suit that has a mid-torso ring closure instead of the pressure-sealing slide fasteners used in earlier space suits.

## Low Leaving NASA to Become Rensselaer Polytechnic Head

NASA Deputy Administrator George M. Low, will leave the Government in June to become the president of Rensselaer Polytechnic Institute, Troy, N.Y. He was formerly Apollo Spacecraft Program Manager and Deputy Director of JSC.

Low, a graduate of Rensselaer and a Trustee of the Institute since 1971, has been NASA Deputy Administrator for the past six years. With the exception of one year as an aerodynamicist with General Dynamics in Ft. Worth, Texas, in 1948, Low's entire professional career has been with the space agency and its predecessor, NACA.

NASA Administrator James C. Fletcher said that he knows of no other person who has contributed as much to achieve and maintain United States leadership in space

exploration. "George Low's influence on the manned space flight program from the very beginning of



NASA, his courageous decisions in the Apollo program, his direction of the agency's programs toward the practical application of space technology, and his initiatives in the development of international cooperation in space have earned the admiration and gratitude of the entire country," Dr. Fletcher said today.

In announcing his plans to leave Government service after nearly 29 years, Low said, "I have an opportunity now which will not be available to me again — to become the president of my own alma mater. Since I am totally dedicated to the proposition that the future of our nation depends on the advancement of science and technology, I know of no better way to help assure that future than by participating directly in the technological education of our young people."

Low joined the National Advisory Committee for Aeronautics (NACA) at the Lewis Flight Propulsion Laboratory in Cleveland, Ohio, as an aeronautical research scientist in 1949. Nine years later, when NASA was organized, he came to its headquarters in Washington as Chief of Manned Space Flight. He was chairman of the special committee that formulated the original plans for the Apollo manned lunar landing program.

He later became Deputy Associate Administrator for Manned Space Flight before transferring to the NASA Manned Spacecraft Center, Houston, as Deputy Director, in February 1964.

In April 1967, after the Apollo 204 fire, Low was named Manager of the Apollo Spacecraft Program. Under his leadership the Apollo spacecraft was redesigned and manned space missions resumed in October 1968 after a lapse of 23 months. He then accelerated the Apollo timetable and brought Apollo 8 into the program as man's first flight into lunar orbit. Under his direction, Apollo 11 made the first manned lunar landing in July 1969.

Appointed Deputy Administrator of NASA by the President in December 1969, Low also served as Acting Administrator from Septem-

ber 1970 to May 1971. He has guided the agency in the transition to the new goals of the 1970's and beyond, and has negotiated the space agreements with the Soviet Union which led to the Apollo-Soyuz joint flight and other cooperative space projects.

Low is a Fellow in the American Institute of Aeronautics and Astronautics, a member of the National Academy of Engineering and a member of several other engineering and technical societies. He received an honorary degree of Doctor of Engineering from Rensselaer and an honorary Doctor of Science degree from the University of Florida in June 1969.

Among the other honors Low has received are two NASA Distinguished Service Medals for his contributions to Apollo 8 and for his work in the Apollo program; NASA's Outstanding Leadership Medal for his contributions to Project Mercury; the Arthur S. Flemming Award as one of the 10 outstanding young men in Government in 1963; the Robert H. Goddard Memorial Trophy in 1973; the National Civil Service League's 1973 Career Service Award for Sustained Excellence in 1973 and the Rockefeller Public Service Award.

Low attended Rensselaer and received a Bachelor of Aeronautical Engineering Degree in 1948 and a Master of Science in Aeronautical Engineering Degree in 1950.

Low was born in Vienna, Austria, June 10, 1926. He came to the United States in 1940, served in the

*(Continued on page 4)*

## Crew Systems Engineers Evaluate New-Concept Space Suit, Rescue Ball

Space travelers of the 1980's who will fly aboard Shuttle Orbiter will be furnished with a unique space suit and rescue system.

JSC engineers are currently evaluating a new space suit concept and rescue system for utilization by pilots and scientists in the 1980's.

Design for the Shuttle suit

features an "off-the-shelf" fit concept, a departure from the Apollo program in which suits were customized for each crewman, a long and costly process. The Shuttle suit, a two piece combination of upper and lower torso, is anticipated to be manufactured in small, medium and large sizes to accommodate the total crew population, inclusive

of females. Each size can then be individually adjusted.

When the Space Shuttle becomes operational in 1980 and conducts as many as 60 missions a year, it will carry a personal rescue system for each of the non-pilot passengers.

Space suits will only be provided for the commander and pilot of the craft and utilized only during EVAs.

In the event an orbiter becomes disabled and is unable to return to earth, a rescue orbiter will be launched to effect a transfer of pilots and passengers from the marooned craft.

Top candidate for other than pilot and commander crew members protection is a Personnel Rescue Enclosure. The 34-inch diameter rescue enclosure ball will contain its own short-term simplified life support and communication systems. The ball which was conceived and fabricated by members of the JSC Crew Systems Division, has three layers (Urethane, Kevlar and an outside thermal protective layer) and small viewing ports of tough Lexan.

Mode of transfer from one vehicle to another may be one of the three methods now being studied by engineers at JSC. One is for a space-suited pilot to carry the rescue ball, much like a suit case, from one vehicle to the other. A second mode is hooking up a clothes-line like device between the two spacecrafts and passing the rescue ball and its passenger to the rescue vehicle. A third method could be the use of the remote manipulator arm, which could pluck the ball and its passenger from

*(Continued on page 2)*

## 'Geno' Cernan to Retire; Unready to Reveal Plans

Eugene A. Cernan, the last man on the moon, plans to retire from the Navy and leave NASA on July 1.

Cernan, 42, a captain, will complete 20 years in the Navy in June. He said last week that he was not ready to announce his plans for the future.

Selected in 1963, Cernan is a veteran of three space missions, including two flights to the moon. As pilot of the Gemini 9 mission in June 1966, he became the second American to walk in space.

He was lunar module pilot of Apollo 10 in May 1969. Cernan and Thomas P. Stafford flew the lunar module to within eight nautical miles of the moon's surface in a full scale rehearsal of all but the final minutes of the first lunar landing mission two months later.

Cernan's opportunity to land on the moon came in December 1972, when he commanded Apollo 17 on the last scheduled manned mission to the moon for the United States. He and lunar module pilot Harrison H. Schmitt landed at Taurus-Littrow on the southeast edge of the Sea of Serenity.

Apollo 17 established several records, including: longest manned



lunar landing flight, 301 hours, 51 minutes; longest lunar surface exploration, 22 hours, 4 minutes; largest lunar sample return, 249 pounds; and longest time in lunar orbit, 147 hours, 48 minutes.

In September 1973, Cernan was named Special Assistant to the Apollo Spacecraft Program Manager. He assisted in the planning, development and evaluation of the joint US-USSR Apollo Soyuz Test Project. Following the completion of that assignment in September 1975, he became Chief of Training Operations in the Astronaut Office.

Cernan has logged 566 hours, 15 minutes of spaceflight. He and his wife Barbara, have a daughter, Teresa Dawn, 13.

# Men in Space Combines Biogs and Illustrations

*Men in Space*, by Thomas D. Segel with illustrations by Dmitri Vail, Paladin Press, Boulder, Colo., 1975.

Author Thomas Segel has taken the standard JSC astronaut biographies and rewritten them in a narrative style aimed toward the lay reader. The book is a handy quick-reference on who flew on which mission, how many flights each astronaut made, where those no longer with the program are now, and those who have not yet flown in space.

Interspersed at the head of each section covering manned flight programs are excerpted significant quotations from space crews following their experiences in space, such as the Apollo 8 crew's impressions of the Earth as it grew smaller, and how the moon's surface struck

them as looking like "dirty beach sand." Jim Lovell's "grand oasis" quote is erroneously tagged "Feeling while on the lunar surface," however.

Pencil drawings and oil paintings by Dallas artist Dmitri Vail are based upon portrait photos and on-board photos from the missions, and are well done. In Dallas social and business circles, it is a sign of having arrived to have one's portrait painted by Vail.

The one weakness in the book is the failure to caption the portraits and sketches as to who is the subject of the illustration. In most cases, the portrait on right-hand page jibes with the biography on the left-hand page. But in others, the illustration is completely unrelated to the facing biography. It is somewhat disconcerting to find Hank Hartsfield's biography, for example, facing a sketch of Gus Grissom in the cabin of Gemini III, or a spacesuited Walt Cunningham opposite Brian O'Leary's biography.

Perhaps only those in the program and space buffs will pick such nits, and the majority of readers will not notice the ambiguity, but a little additional captioning would have helped.

Segel is an ex-Marine with 26 year's service and a former combat correspondent who is now public affairs officer at the Marine Military Academy in Harlingen, Texas. TW



**GROWS IN JOB** — Barbara Baldwin became the Space Environment Test Division's supply technician and property custodian responsible for more than 1500 pieces of technical equipment worth more than \$5.5 million when she completed a year-long Growth Opportunity Program March 15. SETD chief Jim McLane presents her with a Certificate of Participation in the above photo.

**Think Metric**  
- every inch of  
the way!

## Space Suit

(Continued from page 1)

the disabled spaceship and place it aboard the rescue ship.

The new space suit, conceived by suit engineers at JSC, provides a modular construction (upper and lower torso) with a body seal closure at the waist. This eliminates the need for the pressure-sealing slide fasteners used in Apollo and Skylab suits and forms a much more reliable ensemble.

Materials used in the Shuttle suit, the same material used in the rescue ball, provide a much longer shelf life, according to suit technicians who have run extensive pressure and abrasion tests on the new materials.

Utilization of the new, strong and durable Kevlar fabric has permitted technicians to fabricate joints (elbow, wrist, knee, etc.) from the fabric rather than following the Apollo and Skylab suit pattern where joints were constructed of neoprene rubber convolutes and cables. The fabric joints provide better mobility and, equally important, reduce the cost and weight of each suit.

Another feature of the Shuttle suit is the integral portable life support system. When Apollo crewmen walked on the moon they had to wear a bulky 75-pound life support system on their back. The Shuttle suit contains a life support system which is an integral part of the rigid upper torso.



**WHERE IT'S AT — LITERALLY** — James R. Moore of Tracking and Communications Development Division screens listings in a NASA-wide microfilm equipment file in the JSC Technical Library against specifications of test equipment his organization is planning to buy. When equipment listed in the Equipment Visibility System (EVS) microfilm reader is available for use at JSC, at another NASA field center or contractor plant, money is saved by heading off a needless purchase request. Logistics Division urges all JSC technical organizations to first check EVS listings before submitting purchase requests for new equipment.

## Microfilmed EVS Lists Help Stretch Dollars

In these days of tight money, JSC's dollars have to go farther and one way to get more mileage out of the Center's money is to make the best use of expensive equipment. The NASA-wide Equipment Visibility System (EVS) was created about two years ago as a means of keeping the agency's reusable, plant and test equipment busy.

Information on more than 190,000 pieces of equipment, special tooling and non-flight space hardware is stored on microfilm at each of the field centers. Representing an investment of \$2.7 million, the equipment includes some items that are not commercially available, or that are special test items designed and built by NASA or by contractors.

The JSC Logistics Division screens all JSC purchase requests against microfilm listings in Bldg 45 Technical Library to determine whether existing equipment can be reutilized to save the costs of buying new equipment. Some listings are updated monthly and others quarterly.

Logistics Division urges JSC technical employees to screen available equipment listings on the microfilm reader prior to submitting purchase requests for new equipment. JSC EVS Coordinator George F. MacDougall, Jr. points out that the user often has a better notion of what equipment could be utilized than would a logistics employee attempting to match purchase request descriptions with the microfilm listings. Moreover, MacDougall says that JSC managers should assure themselves that equipment requirements cannot be met through EVS listings before approving purchase requests for

new equipment. To date, \$112 million worth of equipment has been utilized through EVS.

The EVS microfilm reader has guidelines and instructions for searching out equipment listings.

EVS questions or problems should be directed to MacDougall at ext 2281.



**COST-CUTTING MINUTEMAN** — Foot-high bronze and walnut Minutemen will be presented to JSC submitters of significant Cost Reduction Reports starting in April and running through December. A "significant" Cost Reduction Report is based on the total money savings, speeding up of schedules or operating methods and increases in productivity. The Minuteman of Concord Bridge and other 1776 skirmishes was chosen as a cost reduction symbol in this Bicentennial Year for his readiness to leave plow and family at a minute's notice to take on responsibilities of citizenship as his new nation was born.

## ALSEP Footnote

As you might have guessed from the last issue of the *Roundup*, there is something strange occurring on the moon. ALSEP 14 is off again. Bendix engineers and NASA technicians have concluded tentatively that there is a short which causes the station to fail when the temperatures on the moon reach their peak around lunar noon. This occurs once every 29 days. According to the engineers in Building 30, room 314 (the ALSEP control room), the station, if it obeys certain laws of logic, will return around April 19. If not, well then...

# ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER      HOUSTON, TEXAS

The **Roundup** is an official publication of the National Aeronautics and Space Administration Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for JSC employees.

Editor: Terry White      Photographer: A. "Pat" Patnesky



**COST REDUCERS** — These 10 JSC employees recently received Cost Reduction Awards for suggesting ways resources could be saved at the Center. The first three employees, top row left to right — John H. Johansen, Marion E. Merrell and Henry L. Williams, all of Reliability Division shared a cash award for proposing reductions in Space Shuttle GSE requirements that saved an estimated \$3.7 million. Other top-row cost savers are Lee M. Brubaker and Ernest L. Camp. Bottom row: Robert A. Dittman, Robert A. Doughty, Dean F. Grimm, Joseph A. Hehn, and Hugh O. Wallace.

**Equal Opportunity  
is good business!**

# EAA ATTRACTIONS

## TICKETS

On sale in Bldg 11 Exchange Store 10 am to 2 pm, no refunds: Windmill Dinner Theater - more tickets will be available April 19. Dean Goss Dinner Theater tickets, \$16/couple. ABC Interstate Theaters, \$1.50. Cabaret Theater at Shamrock Hilton, six tickets only for each performance April 7, 8, 14, 15, 18, 21, 22, 28, 29; \$4 EAA price, regularly \$6.50. Unsold tickets will be returned three days prior to each performance.

Tickets are on sale now for April 10 JSC Children's Easter Egg Hunt - only 500 available at \$1 each. SeaArama \$3.25 adults and \$2.25 children. Free Disney Magic Kingdom and Lion Country Safari Cards. Houston Astros gift coupons, \$4 boxseats and \$3.15 reserve seats. Houston Aeros hockey gift coupons 20 percent off: \$6.75, \$5.95 and \$4.35 for March 26, 28, 30 and April 4 and 6 home games.

The EAA phone number is 4592.

## REALLY WANT TO STOP SMOKING?

Fact: lung cancer is almost non-existent in non-smokers. Additionally, cigarette smoking contributes significantly to chronic bronchitis, emphysema and heart disease.

If you *really* want to stop smoking but have been unable to do so, the Five-Day Plan to Stop Smoking may be just the boost you need.

The course has been offered world-wide with great success, and EAA will sponsor a course at JSC if enough interest is shown. The fee is nominal - only covers material costs.

If you are interested, call 4592 and leave your name and extension.

## KLATE HOLT WINS CAGE TITLE

The Klate Holt Sonics, led by the timely outside shooting of Clark Berry and the tough inside work of Ned Robinson, Haymond Gilbert and Johnny Garrett, defeated a tough Association team 51-49 in overtime to capture the Class A basketball title.

Berry led all scorers with 18 points, Garrett chipped in 11 points, and player-coach Morris Williams had 11 assists in the game.

The sonics also won the Class A League title with a 66-51 waltz over the IBM team. Garrett score 21 points, Gilbert 13 and Woodrow Lee 11. Other team members are Charles Reed, Vern Lauter, Homer Ybanez and James Price.

## LEAGUE SPORTS

Three weeks into the present Volleyball Season has the Harvey Ballbangers leading the League with an 8-1 record. The Upshots are close behind sporting a record of 6-3.

Two Basketball Leagues are presently in full swing. Wednesday Night is led by Klate-Holt with a perfect 3-0 record. They are trailed by the Lakers at 2-1. Of

the seven Thursday Night teams only the Blues are undefeated. They stand at 2-0. Grouped right behind the Blues are 3 teams with equal 2-1 marks. The teams are F-Troop, Marx Brothers, and the Thundering Herd.

Softball Season is scheduled to start the week of April 12th.



Registration for a Mixed Recreational Volleyball League will be held April 1 to 14. The League will start the week of April 19th. Roster forms are available at the Recreation Center.

NASA Softball Teams are invited to play in the Space City Invitational Softball Tournament, to be held April 9, 10 & 11, at the Recreation Center. Entry fee is \$45.00. Forms are available at the Recreation Center or call Mike Slack x2276.

## INFORMATION

Everyone!! Weekly schedules of Recreation Center events are posted on the bulletin boards in both cafeterias and in the gym. Monthly schedules are supplied to your EAA Building Representatives. Recreation Center Phone Numbers are 4921 and 3594.

# Lottie Greenwood Named February JSC Secretary

Lottie R. Greenwood, branch secretary of the Ground Data Systems Division Systems Engineering Branch, was selected as February JSC Secretary of the Month.

In nominating Greenwood for the award, branch chief Sam Sanborn cited her efficient and comprehensive file system for tracking and status of Mission Control Center engineering modifications which "contributed immeasurably to the branch's success in meeting or exceeding its milestones," in readying MCC for manned mission support.

Additionally, she assists the JSC Personnel Office in its recruitments effort at area high schools, and speaks on "What it means to be a secretary" in the annual orientation for JSC summer aids.

"Her cheerful disposition and 'can-do' attitude, her willingness to



accept new assignments and challenges, and her propensity for work all contribute to her outstanding performance as a branch secretary," said Sanborn.

# Roundup Swap-Shop

Swap Shop advertising is open to JSC federal and on-site contractor employees. Goods or services must be offered as advertised, without regard to race, religion, sex or national origin. Non-commercial personal ads should be 20 words or less, and include home telephone number. Typed or scribbled ad copy must be received by AP3/Roundup by Thursday of the week prior to publication.

## BOATS

15-ft Larson XL-5, 55-hp Johnson OB, xInt cond, barely used, big-wheel trailer, worth over \$2400--will take \$2100. Allgeier, 474-3961.

Think sailing! Info on active fleets and membership in Seabrook Sailing Club. Jones, 471-3303.

Dolphin Sr. Sail boat, xInt cond, galv trlr, \$725. Jacobs, 488-0094.

## VEHICLES

69 Ford Torino, good tires, clean, V-8, \$650. 333-3511 after 5.

71 Honda CL-70 street bike, \$150. White, 554-2916.

Rent: Jayco hrdtp fldwn camper, kitchen, icebox, sleep 8, low profile, pulls easy, \$10/day, \$57/week, \$25/weekend (\$25 deposit reserves). Kilbourn, 482-7879.

71 2-dr Toyota Corona Mark II, FM stereo, runs well, good mileage, \$990. 334-3459.

72 Toyota Celica, air, 4-spd stick, mags, 57K miles, perf shape, family has outgrown, \$2275. 483-4776.

JSC Credit Union has following repos for sale: 75 Olds Omega, auto, air; 75 Camaro, 6-cyl, radio; 74 Vega hatchback, air, auto, radio; 74 Dodge Dart, 6-cyl, air, auto; 73 Vega, 4-spd, air, radio; 72 Chevy Sport Coupe, 402 eng, stick; 71 Cadillac 8-cyl Coupe DeVille; 73 Vega hatchback.

75 Pinto Runabout, air, 4-spd, radio, 16K miles, 25 mpg, yellow, clean, \$2800. 482-7461.

72 Yamaha 100cc Enduro, xInt cond, 3800 miles, \$350. Bland, 333-4580.

68 Dodge Coronet, 158K miles, pwr steer, air, auto, runs well, looks good, \$395. 488-5155.

27-in 10-spd Itoh bike, needs front wheel, \$50. Brenton, 483-2021.

73 Honda XL250 (street or dirt), good cond, 3000 miles, \$450. Boykin, 481-0050

70 Pontiac 4-dr, auto, air, \$800. 337-2537 or 337-1965.

73 Plym Gold Duster, slant-6, air, auto, pwr, AM/FM tape, vinyl top, xInt cond. 645-6883.

75 Kawasaki ZI-900, less than 600 mi, \$1950. McKee, Baytn 424-7927.

Motorhome for rent \$125/week plus mileage, daily rates avail. 471-5161

GMC Motorhome for rent, reserve now for spring/summer. 488-4393.

74 Vega hatchback, silver, auto, air, AM/FM, power, etc. \$2300. Hickey, 481-0458.

Coleman deluxe camper, stove, sink, dinette, water tank, lites, \$895. 488-2387.

Nimrod fold-out camper, storage cabinets, nice, \$495. 488-2387.

## PETS

AKC Shelties (toy Collie) Ch bloodline, wormed, shots, 481-6439.

Bassett Hound puppies, perf gift for loved one, AKC Ch line, ready for Easter, \$125. Maley, 488-6871.

Yorkshire terrier, male, AKC reg, 8 mos, \$150. 333-4782 after 5.

## WANTED

Used van, any make, plain, only min access wanted. Bland, 333-4580.

Buy, sell or trade American Flyer S-gauge elec trains and access. 334-3182.

Ladies to join evening exercise class Mon, Tue, Thurs, \$1/month. Billie, 483-6233.

Upright dresser. Giuli, 334-5360 after 6.

Child's water skis, pair or slalom. McCreary, 946-5285.

Small pickup: 73, 74 or 75 Courier, Luv or Toyota. 333-3071.

SCM port elec typtr, or more than 3 yrs old in xInt cond. 643-5333.

Two reasnly-priced used 520x12 wheels and/or tires for boat trlr. 554-3881.

## PROPERTY & RENTALS

70x125-ft Lake Livingston lot in Harts Creek Estates, \$1495, Trees, approx 3/4-mile to marina. 482-1664.

50-ft waterfront Trinity Bay house, garage, fenced, owner finance, \$3000 down. Malone, Baytn 422-2317.

Lake Belton-view lot, water access, Bell county, \$3000 cash. Malone, Baytn 427-7802.

2-acre lot in Friendswood Eldorado subdiv, \$8000. Zupp, 482-7156.

2-bdr apt in by-the-sea condominium at Galveston West Beach, air cond, carpets, full kitch, color TV, weekly rent. Clements, 474-2622.

## HOUSEHOLD ARTICLES

Sears jungle gym, struct sound, needs paint, \$20. Loden, 488-2273.

25-in Heathkit GR-900 color TV, new, unassem in cartons. 488-8678.

American of Martinsville bedroom set, queen-size bed (x-firm), armoire, nit-estands, linens, dark oak, like new, \$600. 334-5972 or 474-4684.

White dinette set: table, four chairs, \$75. 482-1064.

1/2-ton Sears window airconditioner, \$50. 946-5849 after 5.

## MISCELLANEOUS

74 World Book Encyclopedia, xInt

cond, 75/76 yearbooks incl, \$200. Kilbourn, 482-7879.

Attention allergy sufferers: Honeywell electronic air cleaner, about year old, xInt cond, cost \$336, sell \$250. 485-9532.

Pvt/comm/inst flight and ground instruction, biennial checks, simulator avail. Black, 482-1635.

Sears 8-trk tapeplyr & AM/FM stereo system, solid state w/2 spkr, \$90. 554-3881.

Two used 600x15L Fulda tires for VW, \$10. 554-3881.

Camper shell for short-wide Chevy, not much-but worth \$35. 481-0095 after 5.

AQHA Stud Book Registry, 12 vols thru 1970, \$25. 946-5849 after 5.

## FOUND

Pocket calculator in Bldg 30 in February. Contact Security Branch/JM4 in writing w/calculator description.

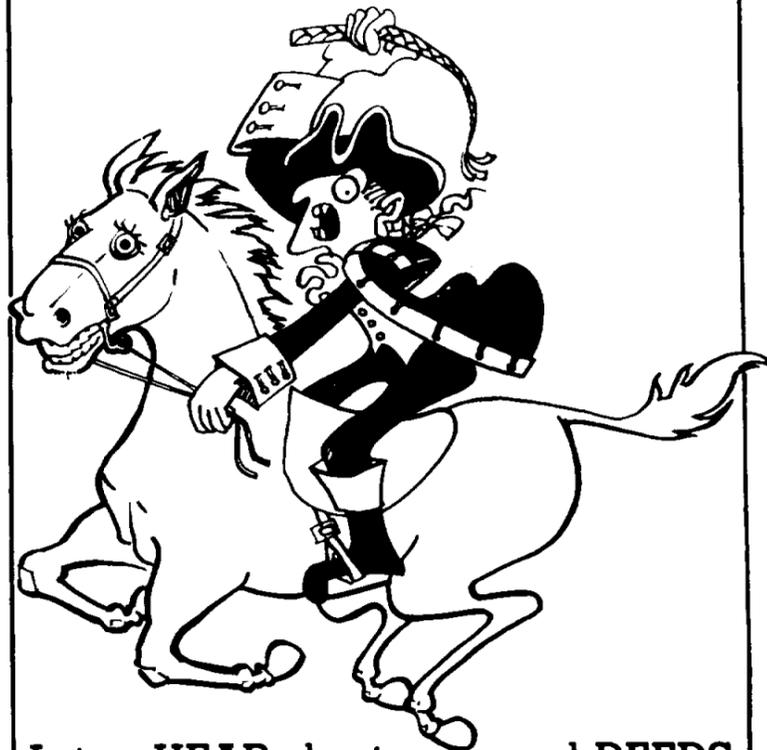
# Marine Band Gives Concert Here April 22

The Quantico Marine Band will give a concert in the JSC Auditorium April 22 at 11:30 am as part of the Band's visit to the Houston area which will include concerts aboard the Battleship *Texas* and in the Pasadena San Jacinto Day parade.

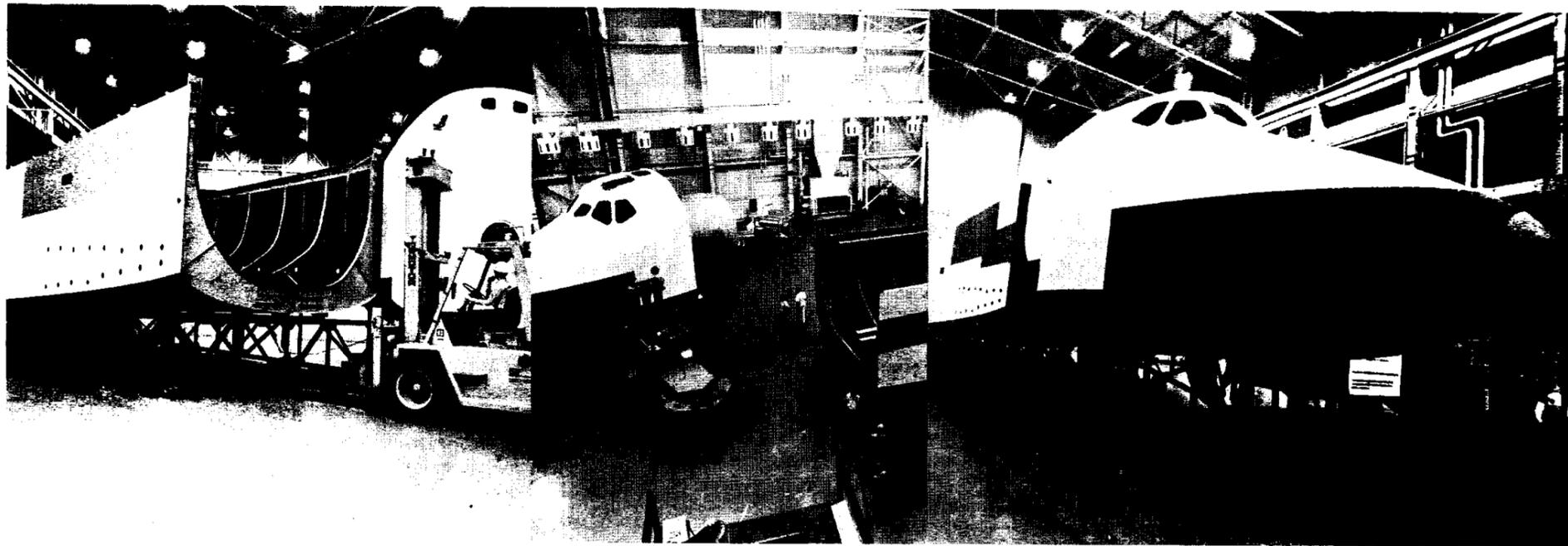
Cpl. Daniel Cree, Band clarinetist, is the son of David Cree of JSC Control Systems Development Division. The Band is part of the USMC Development and Educational Command at Quantico, Virginia.

The Marine Band will give another concert April 22 at Pasadena High School at 7:30 pm. The concerts will feature music with a Bicentennial theme.

# MESSAGES... are HEARD DEEDS... are RECORDED



Let us HEAR about your good DEEDS via Form 1105A (Cost Reduction Report) BH4 - COST REDUCTION OFFICE



WOODEN HANGAR QUEEN — The mid-fuselage of a full-scale Shuttle Orbiter mockup is gently nudged by a forklift from Technical Services Division's model shop into the Spacecraft Design Division Mockup and Training Laboratory in Bldg 9A. TSD modelmakers John Heckler, Levin Crowson, John Fisher, Eldon Pruett, Bruce Sprague, Will Wohnhaas, Les Strum, Mitchell Johnson, Danny Ramirez and others spent

about a year making sawdust and building the 15,000-pound mid-fuselage. TSD earlier had spent nine months building the forward fuselage, with the wing and aft fuselage yet to be built. The mockup will be used in Shuttle Orbiter payload handling and remote manipulator simulations.

## Lunar Science Meet Draws 750 Attendees

by Charles Redmond

About 750 scientists from as far away as the Soviet Union met here last week to discuss and argue the major and finer points of planetary science.

The occasion was the Seventh Annual Lunar Science Conference. The conference this year was attended by about 100 more than in previous years, possibly owing to the addition of a topic on the Earliest History on the Moon and Solar System. Up to this year, the conferences have tended to restrict themselves strictly to lunar studies. This year, however, there were papers presented on the composition of meteorites and asteroids, relationships of the earth to the moon, as well as the planets Mars, Mercury and Venus.

As in previous conferences, most of the papers further refined constraints on lunar models and composition. One of the most significant papers this year was a heat-flow revision outlined in a presentation by Marcus Langseth of the Lamont Doherty Observatory, NY. The work by Langseth and colleagues revised downward the values for the moon's internal heat engine.

Although not quite as germane to the conference, but enlightening in a different manner was the special session held on Tuesday afternoon on the use of lunar materials and expertise for large scale operations in space. Over two dozen prominent scientists presented their schemes for using the moon as a base for remote telescope sites, mining operations, energy stations and the like. Many of the papers dealt with the use of nickel-iron asteroids for the building materials required for such projects, even schemes for exporting refined material recovered from asteroids on the moon to the earth.

Since the first Lunar Science Conference, many things appear obvious: much better analytical techniques have been devised in the intervening years and sample sizes as small as several nanograms can now be used instead of gram-size or

larger samples which were necessary only seven short years ago. Also obvious are the continued use and necessity of the remote stations established on the moon during the Apollo period. These stations continue to provide useful data as with the heat-flow values already mentioned.

Another difference is the extent to which the earth sciences have contributed to lunar science and vice versa. At this year's conference there were several papers discussing the cratering events of earth, all based on the experience gained from studying the moon's craters.

With lunar and planetary science evolving more precisely year by year some scientists expressed hope at this year's conference that we will know answers to some fundamental questions about the moon within the decade. These questions have been refined but remain basically unanswered from the first Lunar Science Conference in 1969: Does the moon have a core; Was the moon at one time part of the primordial earth; or did it originate elsewhere and become captured by the earth.

## Low Leaving

(Continued from page 1)

U.S. Army from 1944 to 1946 and became a citizen in 1945.

Low is married to the former Mary Ruth McNamara of Troy. They have five children — Mark, Diane, David, John, and Nancy — and presently reside in Arlington, Va.

## NASA, NRL Team Measures Ocean Surface Conditions

A NASA-Navy team has returned from a month's expedition to Newfoundland in which ocean surface conditions were measured simultaneously from an aircraft and from a spacecraft 840 kilometers (520 miles) overhead.

Purpose of the mission was to obtain measurements of actual surface conditions from instruments aboard the aircraft for correlation with remotely sensed data acquired by an altimeter carried by NASA's GEOS-3 satellite, launched last April 9.

The expedition team was made up of engineers, technicians and scientists from NASA's Wallops Flight Center in Virginia and the Naval Research Laboratory (NRL) in Washington, D. C.

## DFRC Names Pilots To Fly 747 for ALTs

The initial crew of the 747 Shuttle Carrier Aircraft that will be used to carry and launch the Space Shuttle Orbiter for its Approach and Landing Tests (ALT) has been selected by NASA.

Fitzhugh L. Fulton, Jr., and Thomas C. McMurtry, both of NASA Dryden Flight Research Center will be the pilots. Flight test engineers on board the 747 will be Victor W. Horton, also of DFRC and Louis E. Guidry, Jr., of JSC. All of the men are civilians.

The ALT flights will be conducted at DFRC in early 1977. The specially-modified 747 will carry the Orbiter to an altitude of approximately 7,500 meters (25,000 feet). The Orbiter will then separate from the 747 and the Orbiter crew will pilot the Orbiter to a glide landing. Several unmanned and manned captive flights will precede the initial free flights.

Fulton is a veteran multi-engine test pilot and has extensive experience as a launch pilot. He served as launch pilot for the X-15 and manned lifting bodies as well as other experimental aircraft flight test programs. Fulton was an XB-70

project pilot for both NASA and the USAF. He is currently co-project pilot on the triple-sonic YF-12 flight research program.

Guidry has flown as JSC test engineer on the C-135 Zero-G studies and the C-130 Earth Resources aircraft. Horton is flight test engineer on the YF-12 at DFRC and has flown as launch-panel operator of the B-52 air launch aircraft.

A JSC back-up crew of Joe Algranti and A. J. Roy, Jr. will pilot the 747 on flights at a later date in the program.

## Monday Deadline For Open Doubles Tennis Tourney

The JSC Tennis Club's Spring Open Doubles Tournament is open to non-club members and will include men's, women's and one-bounce doubles events.

Classes in men's and women's doubles are men's advanced, intermediate and novice, and women's advanced and intermediate — depending upon number of entrants. The "one-bounce" class is for less-advanced doubles teams made up of man/man vs. woman/woman or mixed. "One bounce" means the ball must bounce on your side before hitting or the other team wins the point. Net volleying is verboten.

While this kind of tennis polishes one's ground strokes, it can be frustrating for an eager net player.

The tournament will be played at Clear Creek and Clear Lake high schools, and trophies will be awarded in all events.

With an entry fee of \$1/person/event for club members and \$1.50 for non-members, Monday March 29 is the deadline for entries. Send or take fee to Jim Walker/CG5, Bldg 4 Rm 224, ext 2541.

Entrants should bring an unopened can of balls (preferably yellow) to the first match.



MID-EAST LECTURERS — The Apollo half of the Apollo-Soyuz Test Project crew recently completed a lecture tour in Egypt, Saudi Arabia, United Arab Emirates, Qatar and Kuwait under US Information Agency sponsorship. The crew also visited Israel and Algeria. The lectures covered ASTP significant results, desert photography from space, and the Space Shuttle program. In each country, the crew met with heads of state, educators, museum directors and science officials. In the photo above, Apollo crewmen pose with Egyptian President Anwar Sadat in Cairo. Left to right are Thomas P. Stafford, Vance D. Brand, Donald K. Slayton, Sadat, interpreter and lecture translator Dr. Farouk El-Baz of the US National Air and Space Museum, and US Ambassador Hermann Eilts.